

Dec. 19, 1939.

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2,184,117

FILLING MACHINE OF THE CONTINUOUS VARIETY

Filed March 17, 1937

4 Sheets-Sheet 1

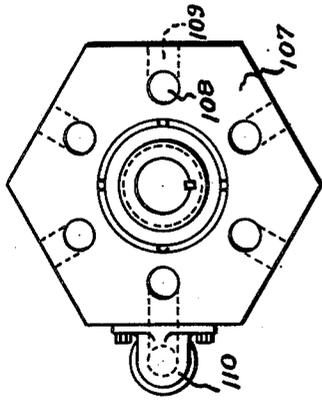


FIG. 3.

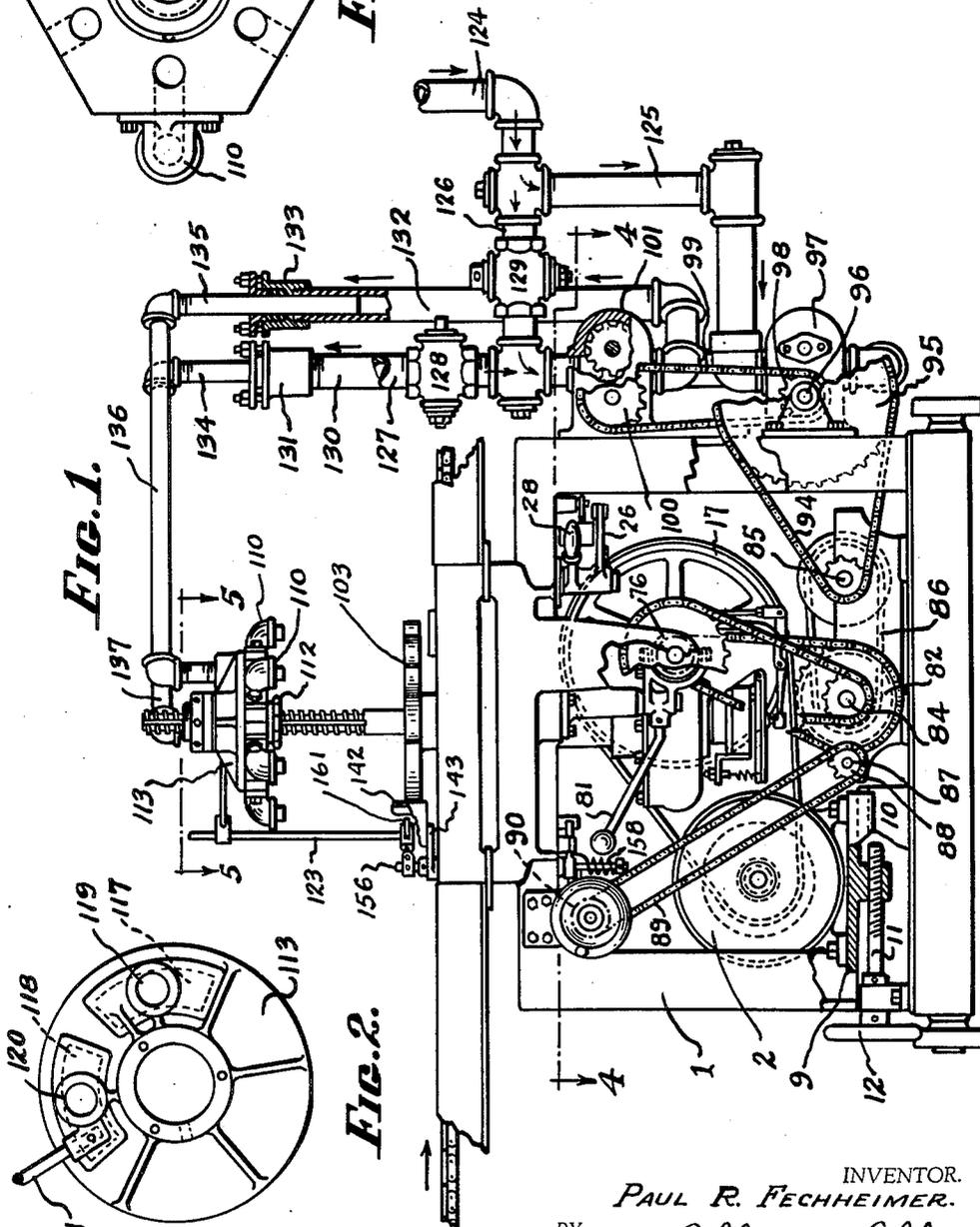


FIG. 1.

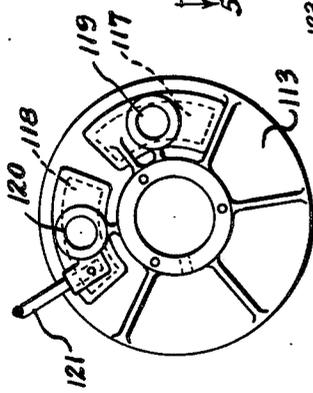


FIG. 2.

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4 Sheets—Sheet 2

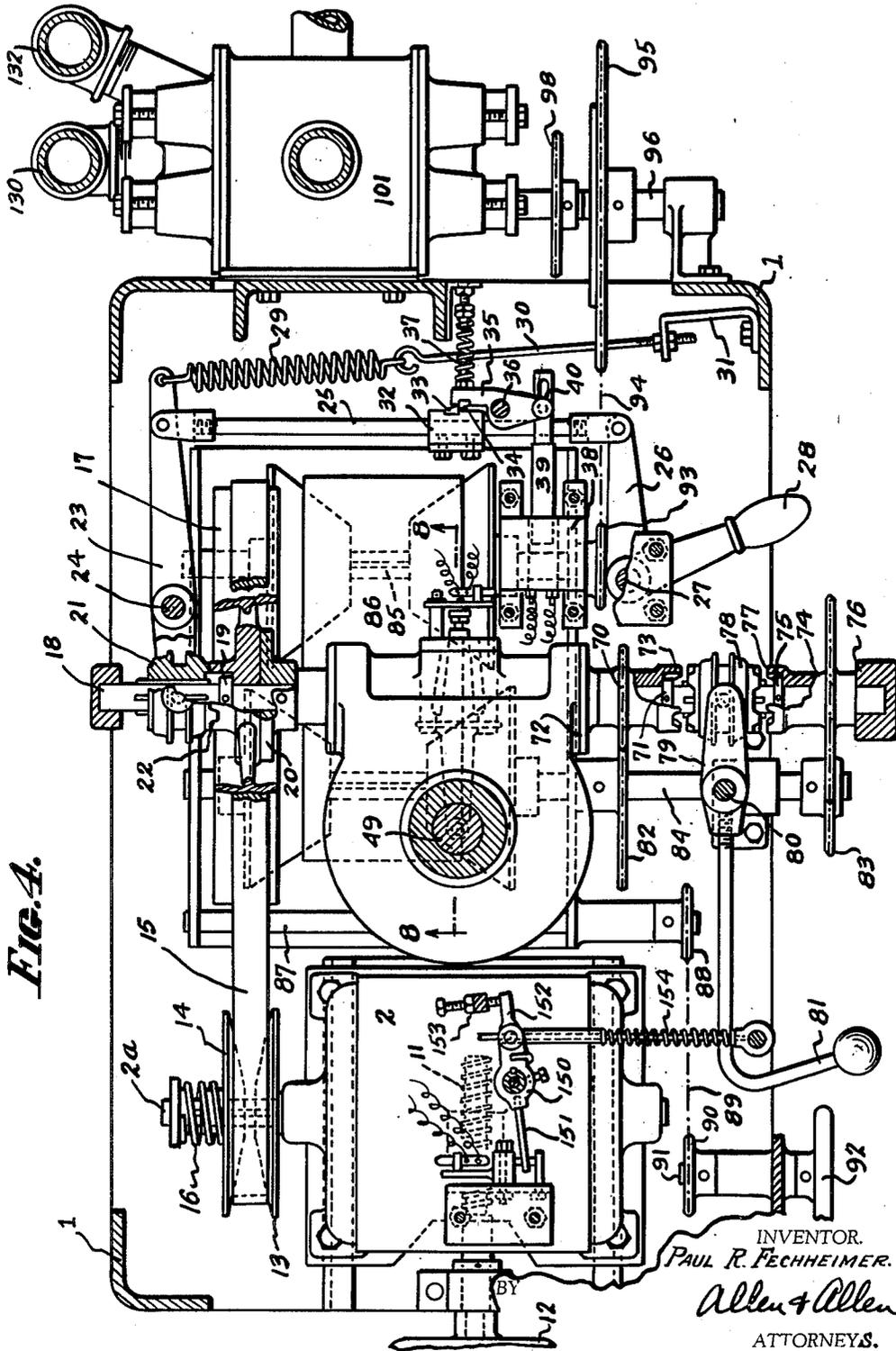


FIG. 4.

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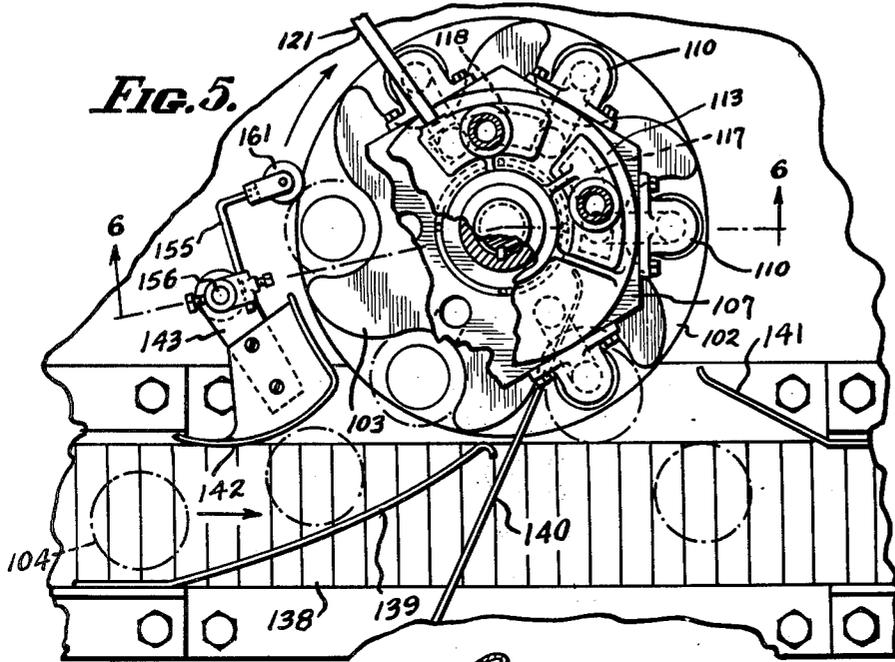
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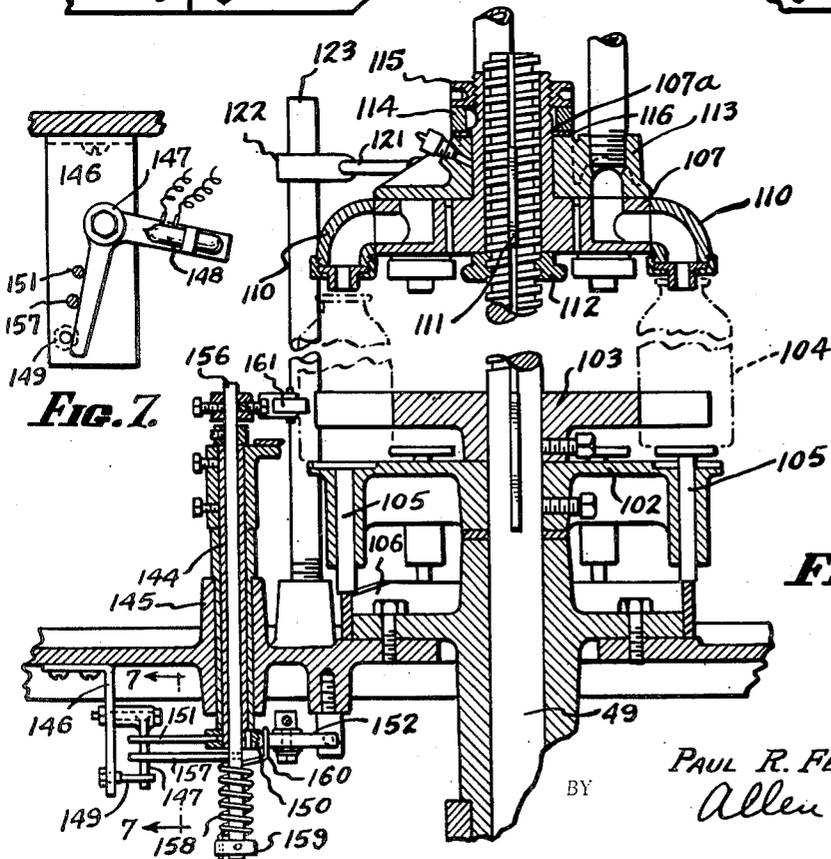
FILLING MACHINE OF THE CONTINUOUS VARIETY

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**Fig. 5.**



**Fig. 7.**

**Fig. 6.**

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4 Sheets—Sheet 4

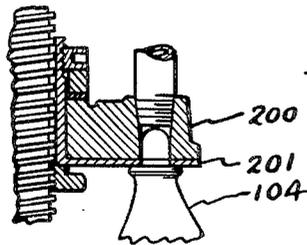
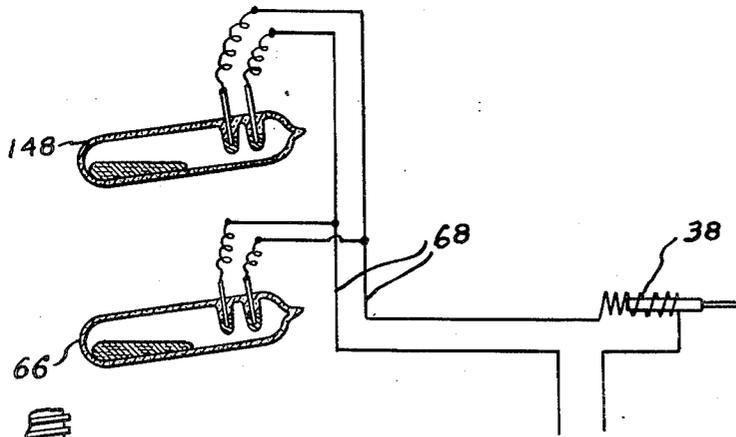
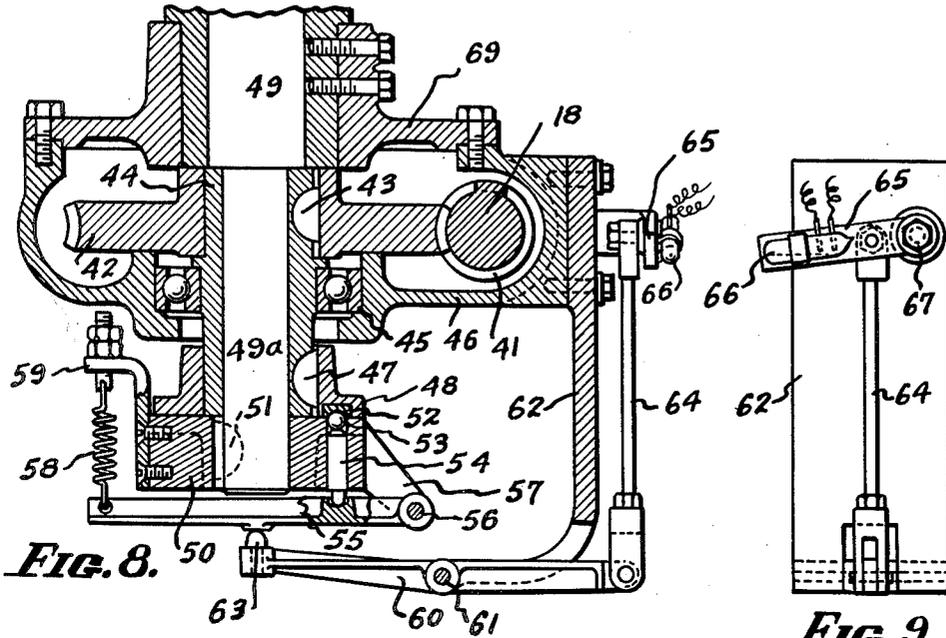


Fig. 10.

Fig. 11.

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# UNITED STATES PATENT OFFICE

2,184,117

## FILLING MACHINE OF THE CONTINUOUS VARIETY

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Application March 17, 1937, Serial No. 131,427

13 Claims. (Cl. 226-97)

My invention relates to filling machines for jars, cans, bottles, collapsible tubes or the like, which filling machines are designed to operate during the continuous travel of the containers to be filled. A machine of this general class is set forth in the Patent No. 1,313,301 of Karl Kiefer, dated August 19, 1919. In this machine there is a rotative table about which the containers pass under the influence of what is essentially, or may be thought of as, a star-wheel or its equivalent. Above this table is located a member rotating therewith, having a plurality of filling spouts adapted to be positioned in proper relationship to the individual containers to be filled, and to travel therewith during the filling operation. These filling spouts are provided with suitable ports in the rotative member; and above the rotative member there is a stationary member having a single port supplied through suitable piping with the material to be filled into the containers. As the rotative member turns in synchronism with the containers the several ports therein come into communication with the port in the stationary member aforesaid, and a measured quantity of the material to be filled into the containers passes through each filling spout, because the full output of the pump is always discharging through one and only one spout, except during that short interval in which one port is closing off and another opening up. This interval is so short that it does not affect the accuracy of fill.

The objects of my invention are the provision of certain improvements in devices of this general character, and in particular the provision of such means as will permit the more rapid filling of containers, and will permit filling of containers in a more effective manner albeit more rapidly. Also it is a purpose of my invention to permit the filling of containers with measured quantities of more than one substance, if desired.

These and the more specific objects of my invention will be more particularly pointed out hereinafter or will be apparent to one skilled in the art upon reading these specifications; and for the sake of clarity, reference is now made to the drawings wherein:

Figure 1 is an elevational view of my machine with portions cut away.

Fig. 2 is a plan view of the stationary member of the filling head.

Fig. 3 is a plan view of the rotary member of the filling head showing one of the filling spouts in position.

Fig. 4 is a horizontal sectional view of my machine taken along the lines 4-4 of Fig. 1.

Fig. 5 is a plan view with parts in section of the filling mechanism and container moving mechanism with guides, showing portions of a safety feature which I have provided.

Fig. 6 is a vertical, and partially sectional, view through the portion of the machine shown in Fig. 5, and is a view taken along the lines 6-6 of that figure.

Fig. 7 is a view of a mercury switch operating mechanism used in conjunction with a safety means aforesaid, and is a view taken along the lines 7-7 of Fig. 6.

Fig. 8 is a vertical sectional view through the mechanism which turns the revolving table, and shows a safety device used in connection therewith. It is a view taken along the lines 8-8 of Fig. 4.

Fig. 9 is a vertical elevation of another mercury switch operating device shown in Fig. 8.

Fig. 10 is a wiring diagram.

Fig. 11 shows in section a somewhat different arrangement of the fixed and movable filler heads.

In the filling of containers with measured quantities of material through a spout, and depending in considerable measure upon the nature of the material being introduced into the containers, it is not always practicable to obtain greater speed by merely increasing the flow of material and speeding up the machine. Under these circumstances, a considerable quantity of material may be lost by splashing, or difficulty may be had with foaming of the material. On the other hand, it is not possible in a machine of this type to secure more rapid filling by simply connecting two or more spouts at any one time to the source of material, since there is no way of controlling how much of the material will be fed into each container. Again, it is not practicable in a machine of this character having one portion of the filling head stationary and one portion rotating, to attempt to fill more than one container at one time with completely independent sources of supply, since it is not possible to arrange the ports to this end without a complete redesign of the entire head. It is possible to arrange a series of ports in a fixed and movable head combination concentrically, and connect different spouts selectively with different ports. A separate pump will be provided for connection with each port. In this way a plurality of containers may simultaneously be filled on a single rotary table. But here there is the prob-

lem of setting up and operating a plurality of pumps each to deliver exactly the same quantity of material in a given length of time. I do not attempt to cover such structure and arrangement in the present application. In the system and construction here disclosed, each container receives exactly the same quantity of material because it is in connection for the same lengths of time with the same pumps which have filled adjacent containers. Therefore, but one adjustment as to quantity is required for each given size of container, and all containers filled will be filled exactly alike.

These are illustrative of certain problems which it is a purpose of my invention to solve, and I have solved them by providing means for introducing material into more than one container at one time while providing for each spout at any given time a controlled and independent source of supply of material, by successively bringing the filling spout for any one container into communication for a controlled length of time with different sources of supply. In this way a plurality of containers may be controllably filled at one time albeit from different sources in succession; but the utilization of different sources makes it possible, where desired, to introduce into any given container measured amounts of different substances. Moreover, the rates of filling can be controlled by control of the various sources, so that in filling a container the initial increment of material may be introduced slowly therein to prevent splashing, whereas additional increments of material may be much more rapidly introduced after the first and without danger of splashing. Moreover, the introduction of material into containers by increments tends to eliminate foaming troubles to some extent.

I shall now proceed to a specific description of my mechanism together with the various drive, safety, adjustment and control means which form a part of my invention. I provide a frame 1, upon which, or in connection with which, the various parts now to be described are mounted. As a prime mover I preferably employ an electric motor 2. This motor may be mounted slidably upon a sub-base 9 movable upon a base 10 by means of a screw 11 provided with a hand-wheel 12. The motor is provided with a pulley, most clearly shown in Fig. 4, as comprising two conical halves 13 and 14 forming a V-shaped groove for the belt 15. The member 14 is slidable on the motor shaft 2a and is urged toward the member 13 (which is fixed on the shaft) by a compression spring 16. This structure constitutes a well-known form of variable speed transmission, inasmuch as the effective diameter of the motor pulley may be changed by varying the position of the motor, as aforesaid.

Power is transmitted by means of the belt 15 to a pulley 17, rotatably mounted upon a main shaft 18, and held in place on the shaft by a small collar 19 on one side and a flange collar 20 on the other. Both of these collars are pinned to the shaft. The shaft 18 is mounted, of course, in suitable journal bearings in the frame of the machine, which bearings may be any desired, and do not require special description.

A slidable clutch member 21 is splined on the shaft 18 and makes engagement by means of teeth with the pulley 17, as shown at 22. When this engagement is made the shaft 18 will be driven by the pulley 17, as will be clear. When, however, the clutch member 21 is moved up-

wardly in Fig. 4, as by means of the clutch lever 23, pivoted as at 24, the driving engagement will be broken and the pulley 17 will be free to rotate on the shaft 18.

The lever 23 is bifurcated and has the usual engagement with the clutch member 21. A link 25 connects the clutch lever 23 with the bell crank 26 pivoted on the frame as at 27. One end of the bell crank is formed into an operating handle 28. When this handle is pushed to the right, the clutch will be engaged, as shown.

A tension spring 29, through the intermediary of a rod 30, is placed between the clutch lever 23 and a suitable bracket 31 on the frame 1 of the machine; and the purpose of this spring is to urge the lever 23 to the clutch-disengaged position. In order to hold the clutch in engaged position, the rod 25 is provided with a collar 32 bearing latch means 33. Cooperating latch means 34 are located on a pawl 35 pivoted as at 36. A compression spring 37 is appropriately located between the pawl and some exterior support such as the frame of the machine, for the purpose of holding the latch in engagement. Thus when the operating handle 28 is thrown and the clutch engaged as hereinabove described, this latching mechanism will hold it in engaged position in spite of the tendency of the spring 29 to throw it out.

As hereinabove described, I have provided means urging the clutch into disengaged position and a latch for holding it in engaged position, so that I may provide a safety feature whereby the drive of the machine may be quickly discontinued upon release of the latch. For this specific purpose a solenoid 38 is mounted on the frame of the machine and has an armature 39 having a lost motion connection as at 40 with the pawl 35. The manner and circumstances in which the solenoid becomes energized will be set forth hereinafter; but it will be clear at this point that upon energization of the solenoid the latch will be released, the clutch thrown out and the power drive of the shaft 18 discontinued.

Referring now to Fig. 8, it will be seen that the shaft 18 bears a worm 41 which meshes with a worm gear 42. This gear is splined as at 43 to a sleeve 44 journaled, as by the roller bearing 45, in a lower housing portion 46. This sleeve is splined as at 47 to another sleeve 48. A main shaft 49 has a reduced portion 49a passing through the sleeve 48. A collar 50 is splined as at 51 to the reduced portion of the shaft. The sleeve 48 has a ball socket 52, and a ball 53 lies in a perforation in the sleeve 50 and is urged upwardly by a pin 54. The pin 54 bears against a lever 55 pivoted as at 56 to a bracket 57 on the collar 50. A tension spring 58, engaging the outer end of the lever 55 and also a bracket 59 on the collar 50 urges the lever and therefore the pin 54 upwardly. The ball 53 therefore normally forms a driving connection between the collar 48 and the collar 50, and permits the shaft 49 to be driven by the shaft 18 through the mechanism hereinabove set forth. However, should the shaft 49 encounter undue resistance to rotation the ball 53 is adapted to slip out of the socket 52, thereby allowing the shaft 49 to stop. In doing this the lever 55 will be depressed.

Another lever 60 is pivoted as at 61 upon a suitable bracket 62 or upon the frame of the machine. A suitable rounded pin 63 bears against the lever 55 at its center of rotation. At its other end, the lever 60 is connected by means of a push link 64 to a lever 65 which carries a mercury 75

switch 66. The lever 65 is pivoted to the bracket 62 as at 67. Thus, if a stoppage occurs in the mechanism so as to throw out the safety drive just described, the lever 60 will be actuated and the mercury switch 66 will be operated. This switch, as indicated in Fig. 10 is located in a circuit 68 which includes the solenoid 38 and, of course, a suitable source of power. Therefore, when the safety drive is thrown out the solenoid will be actuated and the clutch 21, 22 will be disengaged.

The upper part of the housing for the drive for shaft 49 is indicated at 69 both in Fig. 8 and in Fig. 4.

Referring again to the latter figure it will be seen that the shaft 18 bears rotatably a sprocket member 70 held by collars 71 and 72, and provided with clutch teeth 73, and another sprocket member 74 of different diameter also rotatably mounted on the shaft, held by a collar 75 and by a bearing member 76. The latter sprocket also has clutch teeth 77. A clutch member 78 is splined on the shaft 18 and is slidable alternately to engage the clutch teeth 73 and 77. A clutch fork 79, pivoted as at 80 and provided with an operating handle 81, actuates this member. The sprockets 70 and 74 are connected by chains or another suitable driving means to sprockets 82 and 83, respectively, fixed on a shaft 84 journaled on the frame of the machine. By means of the clutch arrangement thus described a two speed drive for the shaft 84 is provided.

Between the shaft 84 and another shaft 85 I provide a variable speed transmission indicated broadly at 86 in the several figures. This variable drive may be of any type desired. I have illustrated it as a reeves type of drive, that is to say, a type wherein the driving and driven shafts are each provided with opposed conical pulley portions slidable on the several shafts and having a connecting belt of fixed thickness. By alternate and opposite movement of the pulley sections the relative speeds of the two shafts can be altered, as is well understood in the art. The movement of the pulley sections to effect the speed changes may be accomplished by mechanism connected with a shaft 87. A sprocket 88 on this shaft may be connected by means of a chain 89 to a sprocket 90 on a shaft 91, suitably journaled in the frame and bearing a hand-wheel 92 in a position of convenient access. The shaft 85 bears a sprocket 93 which is connected by means of a chain or other suitable drive 94 to a sprocket 95 on a shaft 96, and suitably journaled on the frame. This shaft may be directly connected with a pump 97. The shaft 96 also bears a sprocket 98 which may be connected by a chain 99 to the sprocket 100 of a second pump 101. The ratio of speeds of the pumps 97 and 101 therefore is fixed, and will be so chosen in connection with the relative sizes of the pumps as to cause the flow of material delivered by each pump to bear continuously a fixed ratio to the flow of material delivered by the other pump. However, the over all speed of both pumps may be determined both by the variable drive indicated broadly at 86 and by the variable transmission which is actuated by the lever 81. By means, therefore, of the lever 81 and the hand-wheel 92, accurate and gradual speed adjustment over a very wide range may be obtained.

The vertical shaft 49 is provided with a table 102 which is pinned to it, and with a star-wheel or its equivalent 103 also pinned to it. The containers, such as the bottles 104 in Fig. 6, are

brought to the table by a suitable conveyor, as understood in this art, and are placed thereon. The table may be provided with elevating platforms indicated at 105 upon which the containers rest, and which may be elevated by a cam plate 106 so as to bring the containers, at one point in their travel, into closer relationship with the filler spouts located thereabove, as is usual in this art. The shaft 49 bears a rotatable filling head 107 as shown in Fig. 3. This head is provided with inlet ports 108 communicating with horizontal bores 109. The filling spouts 110 are fastened to the head and have openings in communication with these bores. The rotatable filling head 107 is slidable on the shaft 49, but is keyed thereto or otherwise non-rotatably related to it as at 111. For filling different containers of different effective sizes it is desirable to raise and lower the head 107. This is accomplished by means of a nut 112. The head is provided with a sleeve 107a and the fixed filling head indicated at 113 fits over this sleeve. To hold it in place I provide a ring 114 splined to the sleeve and a nut 115 threaded on the sleeve. A suitable washer or gasket 116 may be located between the collar and the fixed filling head.

The fixed filling head, as indicated in Fig. 2 is provided in its under surface with two or more elongated annular outlet ports 117 and 118 communicating with threaded bushings 119 and 120. The under surface of the fixed head 113 and the top surface of the rotary head 107 are in close and liquid-tight contact. The elongated shape of the ports 117 and 118 causes the outlet spouts 110 to be in communication with these ports throughout an appreciable length of travel. In order to keep the fixed head from rotating, it is connected by a rigid bar 121 to a collar 122 vertically slidable on a post 123 fixed on the frame or bed of the machine. Thus while the fixed head may be raised or lowered with the rotating head 107, it will not turn.

As will be seen in Figure 1, a main inlet conduit 124 may be provided for material to be filled into the container. It may be connected as by a conduit 125 to the pump 97. Where it is desired that both pumps operate on the same material, a branch line 126 may be connected with pump 101, as shown. Under some circumstances it may be desired that the different pumps operate upon different materials. Therefore, I have provided the pump 101 with its own separate inlet line indicated at 127. This line and the branch line 126 are provided with valves 128 and 129 for flexibility in operation. The pumps are connected respectively with the threaded bushings 119 and 120 in the fixed filling head hereinabove described. But since, for the filling of different sized containers it will be necessary to raise and lower the fixed and revolving filler heads, flexible conduits are conveniently employed, or a slidable construction, such as that shown in Fig. 1. Here the outlet of pump 97 is a stand pipe 130 terminating in a gland 131, while the outlet of pump 101 is a stand pipe 132 terminating in a gland 133. Pipe portions 134 and 135 are slidable respectively in these stand pipes and glands; and are connected respectively with the threaded bushings 119 and 120 in the fixed filler head by means of rigid pipes 136 and 137, and suitable fittings, as will be clear from the figure referred to.

It will be apparent from Fig. 5 how the containers 104, moving along a conveyor 138 are deflected by a guide 139 onto the table 102 and into

engagement with the star-wheel 103. They move around clockwise with the table and the star-wheel, as indicated by the arrow in this figure, while being filled. When they have completed the desired travel they are removed from the table and star-wheel by means of a deflector 140 so as to be brought again onto the conveyor 138. Supplementary guide means 141 may be provided to insure that the containers reach the conveyor.

While engaged by the star-wheel, the containers move continuously, and during this movement they are filled. So that the containers may be properly filled, it is necessary that each container come into proper relationship with its filling spout. Therefore, it is necessary that each container be properly seated in the space between the teeth of the star-wheel. It is desirable to stop the mechanism if a container is displaced from proper filling position. To this end I provide a guide mechanism 142 in Fig. 5, which is fastened to an arm 143 pinned to a sleeve 144 (see Fig. 6). This sleeve is journaled in a hub 145 on the frame. A bracket 146 bears a pivoted bell crank 147. One arm of this bell crank bears, as at 148, a mercury switch. The other arm normally rests against a stop 149 on the bracket 146. The sleeve 144 has fixed to its lower end a collar 150 which bears a pin 151 lying against the arm of the bell crank, as most clearly shown in Fig. 7.

If a container does not properly seat itself in the star-wheel, the guide member 142 will be displaced, rotating clockwise around the pivot for its arm 143. This, through the mechanism just described, will tilt the bell crank 147, operating the mercury switch. As will be appreciated from Fig. 10, the mercury switch 148 is in parallel with the mercury switch 66 in the circuit 68, so that if this switch is operated, the solenoid 38 will be energized and the main drive clutch thrown out, as has already been described.

In order to maintain the guide means 142 in normal position, the collar 150, as shown most clearly in Figs. 4 and 6, bears an arm 152. The arm swings against an adjustable stop 153 whereby the normal position of the guide 142 may be gauged. A compression spring 154 is effectively located between a suitable external support and an arm 152 to urge it against the stop 153. The exact details of this construction are not a limitation upon my invention. I have shown in Figs. 4 and 6 a stud mounted on the arm 152 and perforated to receive a rod which is pivoted on the frame. A compression spring surrounds this rod and bears against a sleeve thereon which in turn bears against the stud. Other constructions are equally suitable, and a tension spring pulling the arm in the same direction may be employed. The guide mechanism 142, not only is effective as described, in stopping the mechanism upon displacement of a container, but by reason of its resilience is also effective in correcting minor displacements and in preventing jams.

Not only is it necessary to stop the mechanism if a container is displaced from proper filling position; it is equally necessary to stop the mechanism if for any reason a bottle should fail to enter one of the star-wheel spaces. If this is not done, a quantity of the filling material may be lost. To this end I fix an arm 155 (Fig. 5) to a shaft 156. This shaft, as shown in Fig. 6, is rotatably mounted within the sleeve 144. Near its lower end it also bears a pin 157, bearing against the lower arm of the bell crank 147. A torsional spring 158 may surround the lower end of the shaft. One end of it may be fixed to a

collar 159 pinned to the shaft, and the other end may engage a suitable support. In the particular embodiment shown it has been illustrated as engaging the arm 152 as at 160.

The free end of the arm 155 is provided with a suitable bearing means such as a roller 161 approximately in the plane of the star-wheel. If, as the star-wheel rotates, any one of its spaces should fail to hold a container, the arm 155 will swing clockwise under the influence of the spring 158, so that the pin 157 will operate the mercury switch 148 just as would the pin 151 if a container were not properly seated in the star-wheel space.

I have now described the essential mechanism of the particular embodiment of my invention, chosen for the purpose of making an exemplary disclosure. The operation of the mechanism will be readily understood. The motor 2 drives the several operating parts. The containers 104 are fed along the conveyor 138, and placed upon the table 102, and are engaged by the star-wheel 103. They travel continuously with this table. Each container is correctly positioned beneath its particular filling spout. Preferably, the containers are brought into intimate relationship with the filling spout by the platforms 105. As the container travels, the moving filler head travels with it, maintaining the relationship of the spout and the container. During this travel, the spout is first connected for a definite length of travel and, therefore, for a definite time, with the port 118 fed with filling material at a definite rate by the pump 97. As the opening in the movable filling head passes this port, the supply is cut off, but the spout is next connected for a definite length of time with the port 117, fed at a fixed rate with filling material by the pump 101. The pumps 97 and 101 are connected together so as to be driven at a fixed, predetermined relative speed ratio. Thus the relative amounts of material fed into the container from the two pumps is fixed. The overall amount of material so fed, however, is determined by the overall speed of the two pumps. This can be varied in gradual increments by the variable transmission mechanism 86, and can also be varied by the mechanism which has been described in connection with the two-way clutch assembly 73—78—79. Thus a very fine adjustment of the total quantity of material fed into the container is possible, without changing the percentage of the total amount of material fed by each pump. It goes without saying that if a change is desired in the relative amount of material fed by each pump, this can be altered by making, in ways familiar to the mechanic, an appropriate change in the power transmitting connection between the two pumps. It may be remarked that a change in the relative quantities of material fed by the two pumps will usually be required only when it is desired to introduce into each container, measured quantities of different substances.

Where each container is to be filled with a single substance the initial adjustment of the pumps may be made in accordance with the character of the material to be filled. With some materials it is preferable to fill slowly at first and then to continue the filling operation very much more rapidly. With other materials the reverse of this condition is preferable. The drive between the two pumps may be so proportioned as to fill whatever relative filling speeds are found desirable; after which the speed of the common power transmission to both pumps may be varied

to control accurately the total quantities of materials filled into the container.

Where layers of different non-liquid materials, especially layers of different color characteristics, for example different flavors of ice cream, are to be filled into a container, some difficulty may be had because in the head construction shown in Fig. 6, for example, a quantity of one character of material from a previous filling operation may remain in the filling spout and the passageway in the movable head. This will not affect the total quantity of material filled into the container but may make it impossible to secure distinct layers of equal volume. The difficulty may be overcome by substantially limiting any space in the movable filler head and filling spouts in which material from a previous filling operation could collect. In Fig. 11 I have shown a structure in which the fixed filler head 200 is of the same character as before but in which the movable filler head 201 is kept quite thin. The filling spout as such is eliminated and the containers 104 are filled directly through a perforation in the movable filler head. This perforation has so little internal area as to retain substantially no material from a previous filling.

For this purpose also, the filling heads and associated parts of my machine are adjustable, as has been described.

By virtue of the safety devices hereinabove set forth, the table of my machine, the star-wheel and the movable filling head, operated as a unit, may be temporarily disconnected from the driving means by the ball mechanism if an obstruction to operations is encountered. The operation of the ball mechanism, however, also throws out the main driving clutch, otherwise the pumps continuing to operate would overflow the containers then under the ports, with consequent mess and loss of material. Secondly, if a container is not seated in proper filling position in the star-wheel, the mechanism will be stopped to prevent loss of material. Third, if any space in the star-wheel does not receive a container the mechanism will be stopped to prevent loss of material.

It will be clear that by a suitable multiplication of parts, the individual containers may be filled in more than two increments, if desired. This is not ordinarily of importance, unless it is desired to introduce into each container more than two different kinds of materials or unless a very large table and star-wheel is employed.

Modifications may be made in my invention without departing from the spirit of it.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a filling machine, the combination of a continuously moving carrier for containers, a discharging element for a container continuously movable with a container, a plurality of feeding means, and means for connecting said discharging element serially with said feeding means, each of said feeding means arranged to deliver a measured quantity of material per unit of time, and means interconnecting said feeding means, whereby the relative rates of feeding are governed.

2. In a filling machine the combination of a continuously moving carrier for containers, discharging elements moving synchronously with the container carrier, a plurality of controlling elements, each connected by a closed conduit to a separate source of supply, and means for con-

necting each discharging element serially to each source of supply, driving means for said carrier, and a connection between said driving means and said sources of supply, including an interconnection between said sources of supply, and a variable speed means.

3. In a filling machine the combination of a continuously moving carrier for containers, discharging elements moving synchronously with the container carrier, a plurality of controlling elements, each connected by a closed conduit to a separate source of supply, means for connecting each discharging element serially to each source of supply, and an interconnection between said sources of supply fixing the relative feeding speeds of each.

4. In a filling machine the combination of a continuously moving carrier for containers, discharging elements moving synchronously with the container carrier, a plurality of controlling elements, each connected by a closed conduit to a separate source of supply, means for connecting each discharging element serially to each source of supply, and an interconnection between said sources of supply fixing the relative feeding speeds of each, and means for simultaneously varying the operating speeds of all sources of supply.

5. In a filling machine, a continuously moving support for a container, discharge means for said container movable therewith, a series of sources of supply for filling material, means for causing the feeding speeds of said sources of supply to bear a fixed ratio to each other, and means for connecting said discharging means in succession to each of said sources of supply during the continuous travel thereof.

6. In a filling machine adapted to fill a container by successive increments during the continuous travel thereof, a discharge means, a plurality of feeding means, means for connecting said discharge means successively to said feeding means for predetermined lengths of time, and means for controlling the quantity of material fed into said container by varying the operating speeds of said feeding means.

7. In a machine of the class described, a prime mover, a plurality of pumps, a variable speed connection between said prime mover and one of said pumps, a fixed speed connection between said pump and another of said pumps and means for rendering each pump effective serially in feeding material into a container for a predetermined length of time.

8. A process of filling containers which comprises continuously moving a container, and during the continuous travel thereof, introducing into said container fixed increments of material derived from independent feeding sources, the relative rate of feeding of said feeding sources being fixed, and determining the quantity of material fed into said container by varying the overall speeds of all feeding sources.

9. In a device of the class described, a rotating table, a plurality of pumps and filling means serially connectable with said pumps, means permitting stoppage of said table upon the occurrence of an impediment to its movement, and means operated by said first mentioned means for stopping said pumps.

10. In a device of the class described, a rotating table, a plurality of pumps and filling means serially connectable with said pumps, means permitting stoppage of said table upon the occurrence of an impediment to its movement, and

means operated by said first mentioned means for stopping said pumps, said means comprising a clutch effective between said prime mover and said pumps, means for urging said clutch to dis-  
 5 engaged position, means for latching said clutch in engaged position and means for releasing said latch upon stoppage of movement of said table.

11. In combination in mechanism of the class described, moving means for containers compris-  
 10 ing a support having spaces for individual containers, filling means for containers comprising pumps, a prime mover for driving both the afore-  
 mentioned means, means for stopping said pumps if a container becomes displaced on said  
 15 moving means, and means for stopping said pumps if a container falls to enter one of said spaces.

12. In combination with a rotary table and star-wheel, a prime mover, a power transmitting  
 20 connection therebetween, means movable by a displaced container on said table for rendering said motion transmitting connection ineffective,

and means adapted to enter the spaces in said star-wheel in the absence of a container to render said motion transmitting connection in-  
 effective.

13. In combination in a mechanism of the class  
 5 described, a rotating table for containers, a prime mover for driving said table and a motion trans-  
 mitting connection therebetween, including a clutch, a connection between said clutch and said  
 table comprising a movable member, a connec-  
 10 tion between said movable member and said clutch effective to throw out said clutch upon  
 movement of said movable member, a displace-  
 15 able guide means, a connection between said clutch and said displaceable guide means effective  
 to throw out said clutch upon movement of said  
 guide means, and means normally held displaced  
 by containers on said table, and a connection  
 20 between said means and said clutch effective to throw out said clutch upon movement of said  
 displaced means.

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